



Docket No.: SON-2010  
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re Patent Application of:  
Hisao Hayashi et al.

**Appeal No. 2009-003171**

Application No.: 09/772,986

Confirmation No.: 2637

Filed: January 31, 2001

Art Unit: 2895

For: THIN FILM SEMICONDUCTOR DEVICE  
AND MANUFACTURING METHOD  
THEREOF

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Examiner: T. F. Tran

**REQUEST FOR REHEARING**

MS Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

**INTRODUCTORY COMMENTS**

Receipt is acknowledged of the Decision on Appeal (Decision) mailed September 23, 2009 from the Board of Patent Appeals and Interferences ("the Board").

This is a Request for Rehearing under 37 C.F.R. §41.52 in response to the Decision.

This Request is limited to points and authorities believed to have been misapprehended or overlooked by the Board in rendering its Decision. 37 C.F.R. §41.52.

**Remarks/Arguments** begin on page 2 of this paper.

## **REMARKS**

### **I. Generally**

The Federal Circuit instructs that “the Board is required to set forth in its opinions specific findings of fact and conclusions of law adequate to form a basis for [appellate] review.” *Gechter v. Davidson*, 43 USPQ2d 1030, 1035 (Fed. Cir. 1997) (Decision of the Board vacated and remanded for specific findings of fact and conclusions of law adequate to form a basis for appellate review).

The Patent Office may not, because *it* may *doubt* that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in its factual basis. *In re Warner and Warner*, 154 USPQ 173, 178 (C.C.P.A. 1967).

## **II. Claims 17-36**

Page 4 of the Appeal Brief dated February 27, 2008 indicates that Claims 17-36 stand or fall together. Claims 18-36 are dependent upon claim 17.

Claim 17 is drawn to a thin film semiconductor device comprising:

a gate electrode (5) in contact with an insulating substrate (1) (Specification page 9, lines 3-8);

a gate insulating film (4) in contact with a gate electrode (5), said gate electrode (5) being between said insulating substrate (4) and said gate insulating film (4) (Specification page 9, lines 3-8),

wherein a thickness of said gate insulating film (4) is greater than a thickness of said gate electrode (5) (Specification page 9, lines 28-30).

**III. It Is Respectfully Submitted That The Decision On Appeal Relies Upon Assertions That Are Unsupported By Any Disclosure Within Hisao Or By Any Other Objective Supporting Evidence**

Decision on Appeal on page 6 asserts the following:

*With the above discussion in mind, we find no error in the Examiner's articulated line of reasoning (Ans. 9-10) which concludes that, since the ordinarily skilled artisan would desire to make the semiconductor structure of Hisao as small as possible, the smallest disclosed thickness values for the gate electrode, i.e., slightly below 100 nm, and the gate insulator, i.e., 100 nm, would be selected. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, (C.C.P.A. 1955). Accordingly, the resultant structure would have an insulator layer 4 with a thickness greater than the gate electrode thickness as claimed.*

In response, the discovery of an optimum value of a variable in a known process is normally obvious. *In re Aller*, 105 USPQ 233 (1955).

The mere determination of a suitable range of values for a suggested result-effective variable or agent is considered to be *prima facie* within the realm of ordinary skill. *Vanderkooi v. Hoeschele*, 7 USPQ2d 1253, 1255 (Bd. Pat. App. & Int. 1987).

However, an exception to the "optimization" rule of *In re Aller* is where the parameter optimized was not recognized in the prior art as one that would affect the results. *Ex parte Whalen*, 89 USPQ2d 1078, 1083 (Bd. Pat. App. & Int. 2008).

Another exception to the "optimization" rule of *In re Aller* is in cases where the results of optimizing a variable, which was known to be result effective, were unexpectedly good. *In re Antonie*, 195 USPQ 6, 8-9 (C.C.P.A. 1977) (The decision of the board is reversed).

These authorities explain that a variable to be optimized must be in a **known** process for an invention to be unpatentable.

But even if the variable is in a known process, the invention is patentable when it is either **unrecognized** in the prior art as one that would affect the results or produces an **unexpectedly good result**.

At least for the following reasons:

1. The absence of an intention within Hisao to represent thickness of the gate insulating film 4 being greater than the thickness of the gate electrode 5 is believed to have been misapprehended or overlooked by the Board in rendering its Decision.
2. In addition, an exception to the “optimization” rule of *In re Aller* regarding the parameter optimized within the claims on appeal being not recognized in the Hisao as one that would affect the results is believed to have been misapprehended or overlooked by the Board in rendering its Decision.
3. Another exception to the “optimization” rule of *In re Aller* regarding the thickness of the gate insulating film being greater than the thickness of the gate electrode whereby the results of this proportionality are unexpectedly good is also believed to have been misapprehended or overlooked by the Board in rendering its Decision.

These reasons are expounded upon hereinbelow:

**Reason 1:** There is no disclosure of an intent within Hisao to “optimize” the relationship between the gate insulating film 4 and the gate electrode 5 of Hisao, whereby the *thickness of the gate insulating film is made to become greater than the thickness of the gate electrode 5*.

Claim 17 provides that *a thickness of said gate insulating film is greater than a thickness of said gate electrode*.

The Appeal Brief on pages 6-10 and the Reply Brief on pages 2-4 argue that the insulator layer 4 having a thickness greater than the gate electrode thickness is not disclosed within Hisao.

Nevertheless, the Decision on Appeal on page 6 asserts the following:

*We further find that, as recognized by Appellants (App. Br. 8), Hisao discloses ranges of thickness values of the insulator layer 4 and gate electrode 5 which overlap the claimed range.*

In response, Decision on Appeal appears to import a “*claimed range*” into the claims on appeal.

However, the claim language is both clear and unambiguous. No “claimed range” is recited within the claims on appeal.

Instead, the claims on appeal provide for a thickness of the gate insulating film being greater than a thickness of the gate electrode.

***Point 1.1. Thus, it is respectfully submitted that an absence within the claims on appeal of a “claimed range” is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

As noted hereinabove, the discovery of an optimum value of a variable in a known process is normally obvious. *In re Aller*, 105 USPQ 233 (1955).

The mere determination of a suitable range of values for a suggested result-effective variable or agent is considered to be *prima facie* within the realm of ordinary skill. *Vanderkooi v. Hoeschele*, 7 USPQ2d 1253, 1255 (Bd. Pat. App. & Int. 1987).

In referring to Hisao, the Decision on Appeal on page 4 asserts the following in its Findings of Fact as item number 4:

4. *The Figure 1 drawing of Hisao illustrates the thickness of the gate insulating film 4 as being greater than the thickness of the gate electrode 5.*

Likewise, the Decision on Appeal on page 8 asserts the following:

*Lastly, we agree with the Examiner (Ans. 8) that, Appellants arguments (App. Br. 7; Reply Br. 2) to the contrary notwithstanding, the Figure 1 illustration of Hisao, which unambiguously shows the thickness of gate insulating film 4 being greater than the thickness of the gate electrode 5 (FF 4), provides further evidence which buttresses the Examiner's conclusion as to the obviousness of making the gate insulating film thickness greater than the gate electrode thickness.*

In response to these assertions, there is no showing within Hisao of a requisite intent for the gate insulating film 4 thickness being greater than the gate electrode 5 thickness.

Ordinarily drawings which accompany an application for a patent are merely illustrative of the principles embodied in the alleged invention claimed therein and do not define the precise proportions of elements relied upon to endow the claims with patentability. *In re Olson*, 101 USPQ 401, 402 (C.C.P.A. 1954).

This concept is further explained within M.P.E.P. §2125, which suggests in part when “*drawings can be used as prior art*”. In particular:

Drawings and pictures can anticipate claims if they clearly show the structure which is claimed. *In re Mraz*, 455 F.2d 1069, 173 USPQ 25 (C.C.P.A. 1972). However, the picture must show all the claimed structural features and how they are put together. *Jockmus v. Leviton*, 28 F.2d 812 (2d Cir. 1928). The origin of the drawing is immaterial. For instance, drawings in a design patent can anticipate or make obvious the claimed invention as can drawings in utility patents. When the reference is a utility patent, it does not matter that the feature shown is unintended or unexplained in the specification. The drawings must be evaluated for what they reasonably disclose and suggest to one of ordinary skill in the art. *In re Aslanian*, 590 F.2d 911, 200 USPQ 500 (C.C.P.A. 1979). See MPEP §2121.04 for more information on prior art drawings as “enabled disclosures.”

Regarding *In re Aslanian*, which is cited within M.P.E.P. §2125, the Decision on Appeal on page 8 asserts the following:

*It is well settled that the drawings of a prior art disclosure must be evaluated for what they reasonably disclose to one of ordinary skill. See In re Aslanian, 590 F.2d 911, 914 (C.C.P.A. 1979).*

In response, it is respectfully submitted that *In re Aslanian*, 200 USPQ 500 (C.C.P.A. 1979) is **not pertinent** to the issues before the Board and **should not have been followed** within the Decision on Appeal.

Specifically, U.S. patent practice and procedures dictate that in general terms, a “*utility patent*” protects the way an article is used and works ( 35 U.S.C. 101), while a “*design patent*” protects the way an article looks ( 35 U.S.C. 171). M.P.E.P. §1502.01. See, *Carman Industries, Inc.*



v. *Wahl et al.*, 220 USPQ 481, 486 n. 13 (Fed. Cir. 1983)(“Utility patents afford protection for the mechanical structure and function of an invention whereas design patent protection concerns the ornamental or aesthetic features of a design.”).

For convenience, one of the INID codes from page 1 of the original Japanese version of Hisao is reproduced below.

## (12) 公 開 特 許 公 報 (A)

International patent practice and procedures that have been approved for use by the U.S. Patent and Trademark Office require an INID code designation “ (S) ” for a Design patent document, whereas the INID code designation “ (A) ” identifies that reference as a utility model document. See M.P.E.P. §§ 901.05(b), 1851.

Here, Hisao is identified as a utility model document (INID code “ (A) ”), and is not identified as a Design patent document.

Conversely, *In re Aslanian* identifies the *La Barber* document as Design Patent No. D228,474. *In re Aslanian* at 500.

Designation of the *La Barber* document is as a design patent and not a utility model document.

In this regard, *In re Aslanian* provides the following on page 503:

[4] In determining what a design patent teaches or fairly suggests to one skilled in the art, it must be remembered that although patentability of a design may not be based upon functional considerations, the specific disclosure of structure in a design patent application may inherently teach functional features. *In re Garbo*, 48 C.C.P.A. 845, 287 F.2d 192, 129 USPQ 72 (1961).

As shown hereinabove, *In re Aslanian* identifies the *La Barber* document referred to therein as a design patent and not as a utility model document, whereas the utility model document of Hisao is not indicated as being a design patent. Unlike the *La Barber* document of *In re Aslanian*, Hisao is a utility model document and not a design patent.

Since the *La Barber* document of *In re Aslanian* is a design patent and not a utility model document, the *In re Aslanian* opinion is irrelevant and unrelated to the issues on this appeal regarding the structural proportions purported in the Decision on Appeal to have existed within the drawings of Hisao (a utility model document).

***Point 1.2. Thus, the La Barber document of In re Aslanian being a design patent and not a utility model document is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

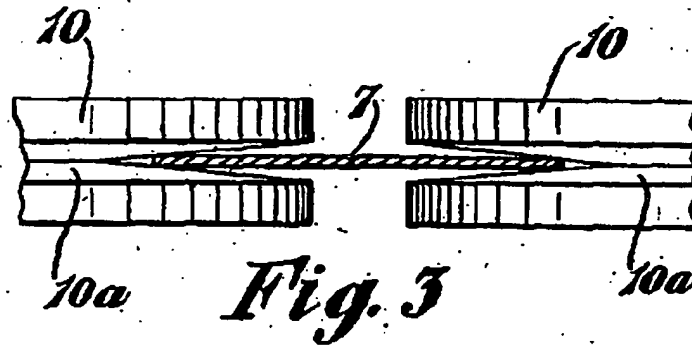
***Point 1.3. Likewise, reliance upon In re Aslanian in the Decision on Appeal when no design patent has been applied against the claims on appeal is also believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

***Point 1.4. Moreover, the absence within the Decision on Appeal of any relevant authority for showing that “drawings of a prior art disclosure must be evaluated for what they reasonably disclose to one of ordinary skill” when the cited prior art reference is a utility model application is also believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

A concise review of *In re Mraz*, 173 USPQ 25 (C.C.P.A. 1972) may also be helpful. *In re Mraz* is cited within M.P.E.P. §2125.

*In re Mraz* refers to Figure 3 of U.S. Patent No. 2,326,715 (Wilson).

Figure 3 of the Wilson reference is provided hereinbelow for convenience.



*In re Mraz* on page 27 provides the following (*emphasis added*):

[ 2 ] Answering the first argument, as we said in *Wilson*, *supra*, “Patent drawings are not working drawings \* \* \*.” However, we did not mean that things patent drawings show clearly are to be *disregarded*. In *re Bager*, also cited by appellant, is an example of a case in which the teachings of patent drawings, even as to features unexplained by the specification, proved dispositive. As this court there said, “Description for the purposes of anticipation can be by drawings alone as well as by words.” In *Wilson*, as our opinion emphasizes, the attempted reliance was not only on a patent drawing per se, it was on “a greatly enlarged section of a small drawing obviously never intended to show the dimensions of anything.” Here, Fig. 3 in the *Wilson* reference focuses on the edge rolls, showing them with great particularity and showing the grooves thereon to have an angularity well within the range recited in appellant's claims. *Wilson*, therefore, shows this aspect of subject matter lying within appellant's claims to be old.

Conversely, Hisao fails to proffer an intent that the proportional thicknesses of the gate insulating film 4 and the gate electrode 5 are to be depicted within Figure 1.

Here, there is a long standing tradition within U.S. patent practice that arguments based on the measurement of a drawing *are of little value absent any written description* in the specification of the quantitative values allegedly shown within the drawings. *In re Wright*, 193 USPQ 332, 335 (C.C.P.A. 1977).

As noted at least within the Appeal Brief on page 7 and within the Reply Brief on page 2 regarding utility model applications, drawings **do not** define the precise proportions of the elements and **may not** be relied on to show particular sizes *if the specification is completely silent* on the issue. *Hockerson-Halberstadt Inc. v. Avia Group International Inc.*, 55 USPQ2d 1487, 1491 (Fed. Cir. 2000). See M.P.E.P. §2125 (proportions of features in a drawing are not evidence of actual proportions when drawings are not drawn to scale).

Specifically, it is well established that *patent drawings are not working drawings* and this argument is predicated, moreover, on a greatly enlarged section of a small drawing obviously **never intended to show the dimensions** of anything. *In re Wilson*, 136 USPQ 188, 192 (C.C.P.A. 1963).

i) Here, *Findings of Fact item number 4 fails* to identify any *written description in the specification of Hisao* that expressly or indirectly describes the gate insulating film 4 as **being greater** than the thickness of the gate electrode 5.

Instead, Hisao arguably teaches **an insulator layer 4** having a thickness of 100-200 nm (figure 2(C), paragraph [0016]) and arguably teaches a thin film semiconductor device including a gate electrode 5 having an **upper layer 5a** with a thickness that is “about” 50-300 nm and **a lower layer 5b** with a thickness that is “in the range of” 50-200 nm (paragraph [0012]).

Yet, the express language within Hisao, as evidenced by paragraphs [0012] and [0016], **fails** to show as a requirement that the thickness of the gate insulating film 4 of Hisao is greater than the thickness of the gate electrode 5 of Hisao.

As a consequence, Figure 1 of Hisao is ambiguous as to the thickness of the gate insulating film 4 in proportion to the thickness of the gate electrode 5.

ii) Likewise, *Findings of Fact item number 4 fails* to show that Figure 1 of Hisao was drawn to any particular scale. *Go Medical Industries Pty. Ltd. v. Inmed Corp.*, 80 USPQ2d 1629, 1634 (Fed. Cir. 2006).

iii) Regarding the gate insulating film 4, *Findings of Fact item number 4 fails* to show that the gate insulating film 4 of Figure 1 was drawn to scale.

iv) Regarding the gate electrode 5, *Findings of Fact item number 4 fails* to show that the gate electrode 5 of Figure 1 was drawn to scale. Of course if this element were not drawn to scale it cannot be seen how such a representation in the drawing could be seriously relied upon, when it might possibly be of larger proportions. *Ericson v. Shaff*, 42 USPQ 121, 123 (C.C.P.A. 1939).

Here, there is no disclosure within Hisao for expressing that the gate insulating film 4 thickness depicted within Figure 1 is intended to be greater than the gate electrode 5 thickness.

Instead, page 8 of the Appeal Brief highlights that “*This failure of some teaching within Hisao is especially apparent when the skilled artisan could reasonably conclude from the ranges presented within the Final Office Action that the alleged gate insulating film 4 could also be of a thickness that is less than that of the gate electrode 5.*”

Accordingly, the thickness of the gate insulating film 4 being less than the thickness of the gate electrode 5 is also quite possible, in the absence within Hisao of any contrary disclosure.

***Point 1.5. Thus, the possibility of Figure 1 of Hisao depicting the thickness of the gate insulating film 4 as being less than the thickness of the gate electrode 5 is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

Apparently, the proportions shown in Figure 1 of Hisao are merely the result of a draftsman's selection rather than the embodiment of an intention to represent the device to scale. In *re Ringel*, 36 USPQ 351, 353 (C.C.P.A. 1938).

***Point 1.6. Thus, the absence of an intention within Hisao to represent thickness of the gate insulating film 4 being greater than the thickness of the gate electrode 5 is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

In the absence of any written description within Hisao as to the proportional relationship between the thickness of the gate insulating film 4 and the thickness of the gate electrode 5, and in the absence of any kind of disclosure that Figure 1 of Hisao was drawn to scale, it is respectfully submitted that *Findings of fact item number 4* within the Decision is unsupported by any written description within Hisao, any court decision, or any other authority regarding proportions that are purportedly shown within the drawings of Hisao.

***Point 1.7. Thus, the absence of any written description within Hisao that discloses the Figure 1 drawing of Hisao as illustrating the thickness of gate insulating film 4 being greater than the thickness of gate electrode 5 is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

In the absence of any written description pertaining to the proportions of the elements within a utility model application for patent, the position set forth within the Decision on Appeal that the proportional size of features can be readily ascertained from the drawings of the utility model application for patent is inconsistent with prior decisions by the Board. See *Ex parte Horton*, 226 USPQ 697, 699 (Bd. Pat. App. & Int. 1985)(The claim limitations at issue in Olson described spatial relationships on the order of a few thousandths of an inch which simply could not be ascertained from the drawings).

***Point 1.8. Thus, this prior opinion by the Board (Ex parte Horton) is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

***Point 1.9. Additionally, the existence of the doctrine that “drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue” is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

Here, the Decision on Appeal has not pointed to any teaching within Hisao, or provided any explanation based on scientific reasoning, that would support its conclusion that those skilled in the art would have considered it obvious to “optimize” the relationship between gate insulating film 4 and the gate electrode 5 of Hisao whereby the *thickness of the gate insulating film is made to become greater than* the thickness of the gate electrode 5.

***Point 1.10. Thus, the absence of an intention within Hisao to represent the thickness of the gate insulating film 4 being greater than the thickness of the gate electrode 5 is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

**Reason 2: Exception to the “optimization” rule of *In re Aller* – Optimization of the relationship between the thickness of gate insulating film 4 and the thickness of the gate electrode 5 was not recognized in Hisao.**

The *Appeal Brief* on pages 6-10 and the *Reply Brief* on pages 2-4 argue that the insulator layer 4 having a thickness greater than the gate electrode thickness is not recognized within Hisao.

Accordingly, there is no concession as to the veracity of the position set forth within the Decision on Appeal on page 6 that *the resultant structure would have an insulator layer 4 with a thickness greater than the gate electrode thickness as claimed*.

As noted hereinabove, an exception to the “optimization” rule of *In re Aller* is where the parameter optimized was not recognized in the prior art as one that would affect the results. *Ex parte Whalen*, 89 USPQ2d 1078, 1083 (Bd. Pat. App. & Int. 2008).

Regarding the alleged optimization within Hisao of the relationship between the thickness of gate insulating film 4 and the thickness of the gate electrode 5, in a prior opinion of the Board, Judge Grimes has explained the following in *Ex parte Whalen*, 89 USPQ2d 1078, 1083-1084 (Bd. Pat. App. & Int. 2008):

[ 3 ] The Examiner has not made out a prima facie case that the claimed compositions would have been obvious based on the teachings of Evans, Greff '767, or Taki. While “the discovery of an optimum value of a variable in a known process is normally obvious,” *In re Antonie*, 559 F.2d 618, 620 [195 USPQ 6] (C.C.P.A. 1977), this is not always the case. One exception to the rule is where the parameter optimized was not recognized in the prior art as one that would affect the results. *Id.* Here, the Examiner has not pointed to any teaching in the cited references, or provided any explanation based on scientific reasoning, that would support the conclusion that those skilled in the art would have considered it obvious to “optimize” the prior art compositions by increasing their viscosity to the level recited



in the claims. No reason to have done so is apparent to us based on the record. On the contrary, the references all suggest that low viscosity was a desired property in embolic compositions. Evans teaches that a preferred composition has a viscosity of 60 centipoise or less at 20° C (FF12). Appellants calculate, and the Examiner does not dispute, that 60 centipoise at 20° C corresponds to less than 75 cSt at 40° C (App. Br. 12). Therefore, Evans' preferred composition has a viscosity less than half of that required by the instant claims.

Likewise, Greff '767 teaches that a composition with a viscosity of 145 cSt at 20° C had “physical properties which make[ ] injection ... into vascular sites significantly more difficult” (FF20, FF22) — and the only physical property of the composition discussed is its viscosity. In agreement with the other references, Taki teaches that its composition had a low viscosity (FF24) and had the desirable property of being easily injected through a microballoon catheter (FF24).

Thus, the references teach that low viscosity is a desirable characteristic for embolic compositions. In our view, none of the cited references would have led a person of ordinary skill in the art to modify the known embolic compositions by increasing their viscosity to at least 150 cSt at 40° C. The Examiner has not adequately explained why such a modification would have been obvious.

***Point 2.1. Thus, this prior opinion by the Board (Ex parte Whalen) is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

In this regard, the parameter optimized being unrecognized in the art as a result-effective variable is an exception to the “optimization” rule of *In re Aller*. *In re Antonie*, 195 USPQ 6, 8-9 (C.C.P.A. 1977).

***Point 2.2. Thus, this exception to the “optimization” rule of In re Aller is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

Here, Hisao arguably teaches an insulator layer 4 having a thickness of 100-200 nm (figure 2(C), paragraph [0016]) and arguably teaches a thin film semiconductor device including a gate electrode 5 having an upper layer 5a with a thickness that is “about” 50-300 nm and a lower layer 5b with a thickness that is “in the range of” 50-200 nm (paragraph [0012]).

However, the Decision on Appeal, in its Findings of Fact, fails to identify the thickness of the insulator layer 4 as being a result-effective variable.

Likewise, Hisao itself fails to recognize the thickness of the insulator layer 4 as a result-effective variable.

***Point 2.3. Thus, the thickness of insulator layer 4 of Hisao being unrecognized in the art as a known result-effective variable is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

The Decision on Appeal, in its Findings of Fact, also fails to identify the thickness of the gate electrode 5 as being a result-effective variable.

Likewise, Hisao itself fails to recognize the thickness of the gate electrode 5 as a result-effective variable.

***Point 2.4. Thus, the thickness of gate electrode 5 of Hisao being unrecognized in the art as a known result-effective variable is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

But even if the insulator layer 4 and gate electrode 5 are recognized within Hisao as result-effective variables, the Decision on Appeal fails to identify any written description in the specification of Hisao for the teaching that a thickness of the gate insulating film 4 being greater than a thickness of the gate electrode 5.

In this regard, pages 3-4 of the Reply Brief argue that the Examiner's Answer fails to highlight any disclosure within Hisao to support the broad conclusory statement proffered within the Examiner's Answer that *a person of ordinary skill in the art would have selected the smallest values for the gate insulating film and the gate electrode disclosed in Hisao in order to obtain a device as small as possible.*

To have a reasonable expectation of success, one must be motivated to do more than merely to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the *prior art* gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful. *Pfizer Inc. v. Apotex Inc.*, 82 USPQ2d 1321, 1333 (Fed. Cir. 2007).

However, the Decision on Appeal fails to identify any objective teaching that a person of ordinary skill in the art would have selected the smallest values for the gate insulating film and the gate electrode disclosed in Hisao in order to obtain a device as small as possible.

Similarly, the Decision on Appeal fails to highlight any objective teaching within the cited prior art to indicate which parameters within Hisao were critical or which of the many possible choices within Hisao is likely to have been successful.

As a consequence, no objective evidence or disclosure within Hisao for supporting *the Examiner's articulated line of reasoning* has been identified is the Decision on Appeal.

***Point 2.5. Thus, the absence of any disclosure within Hisao or other objective supporting evidence for supporting the Examiner's articulated line of reasoning on pages 9-10 of the Examiner's Answer also believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

Assertions of technical facts in areas of esoteric technology must always be supported by citation to some reference work recognized as standard in the pertinent art and the appellant given,

in the Patent Office, the opportunity to challenge the correctness of the assertion or the notoriety or repute of the cited reference. *In re Pardo and Landau*, 214 USPQ 673, 677 (C.C.P.A. 1982).

The support must have existed at the time the claimed invention was made. *In re Merck & Co., Inc.*, 231 USPQ 375, 379 (Fed. Cir. 1986).

It is respectfully submitted that in the absence of any disclosure within Hisao or any other objective evidence, “*the Examiner's articulated line of reasoning*” on pages 9-10 of the Examiner’s Answer is merely a personal conclusion of the Examiner.

Broad conclusory statements, standing alone, are not evidence. *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

In addition to the absence of any objective supporting evidence or disclosure within Hisao, it is impermissible, however, simply to engage in a hindsight reconstruction of the claimed invention, using the applicant's structure as a template and selecting elements from references to fill the gaps. *In re Gorman*, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991).

To imbue one of ordinary skill in the art with knowledge of the invention [on appeal], when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 220 USPQ 303, 312-313 (Fed. Cir. 1983).

Here, the Decision on Appeal adopts the Examiner’s Answer contention that *a person of ordinary skill in the art would have selected the smallest values for the gate insulating film and the gate electrode disclosed in Hisao in order to obtain a device as small as possible.*

At least for the following reasons, in the absence of any disclosure within Hisao or any other objective supporting evidence, *the Examiner's articulated line of reasoning* appears to have been merely an extraction from the Appellant’s own specification.

In this regard, Appellant's own specification notes that "*The thinner the thickness of the gate electrodes, the less becomes its thermal capacity, and the difference in thermal condition is reduced on the gate electrodes and on the insulating substrate.*" (Specification at page 12, lines 6-9).

Appellant's own specification further notes that "*As illustrated, the thinner the thickness of the gate electrodes, the more alleviated becomes the level difference, and accordingly appearance of the pinholes is also reduced in quantity.*" (Specification at page 12, lines 19-21).

***Point 2.6. Thus, the apparent extraction of the Examiner's articulated line of reasoning from the Appellant's own specification is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

***Point 2.7. Likewise, "optimization" of the relationship between gate insulating film 4 and the gate electrode 5 of Hisao being unrecognized in Hisao as a result-effective variable is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

***Point 2.8. Additionally, an exception to the "optimization" rule of In re Aller regarding the parameter optimized within the claims on appeal being not recognized in the Hisao as one that would affect the results is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

**Reason 3: Another exception to the “optimization” rule of *In re Aller* – The results of optimizing a variable, which was known to be result effective, were unexpectedly good.**

As noted hereinabove, another exception to the “optimization” rule of *In re Aller* is in cases where the results of optimizing a variable, which was known to be result effective, were unexpectedly good. *In re Antonie*, 195 USPQ 6, 8-9 (C.C.P.A. 1977)( The decision of the board is reversed).

The Appeal Brief on pages 11-12 and the Reply Brief on pages 4-6 argue that the insulator layer 4 having a thickness greater than the gate electrode thickness would produce unexpectedly good results.

Accordingly, there is no concession as to the veracity of the position set forth within the Decision on Appeal on page 6 that *the resultant structure would have an insulator layer 4 with a thickness greater than the gate electrode thickness as claimed*.

Here, it is respectfully submitted that the Decision on Appeal had not shown that the Examiner had made a *prima facie* case of obviousness respecting the claims on appeal, and that evidence of comparative testing is unnecessary in rebuttal. *In re Clemens, Hurwitz, and Walker*, 206 USPQ 289, 296 (C.C.P.A. 1980).

But even if the Decision on Appeal had shown that the Examiner had made a *prima facie* case of obviousness, one way for a patent applicant to rebut a *prima facie* case of obviousness is to make a showing of “unexpected results,” i.e., to show that the claimed invention exhibits some superior property or advantage that a person of ordinary skill in the relevant art would have found surprising or unexpected. *In re Geisler*, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997).

As explained within *In re Borsch and Slaney*, 205 USPQ 215, 219 (C.C.P.A. 1980):

[ 2 ] It is well settled that a *prima facie* case of obviousness may be rebutted “where the results of optimizing a variable, which was known to be result effective, [are]

unexpectedly good.” In re Antonie, supra, 559 F.2d at 620, 195 USPQ at 8-9, and cases cited therein. It is also well settled that proof of unexpected properties may be in the form of direct or indirect comparative testing of the claimed compounds (here, alloys) and the closest prior art. In re Payne, 606 F.2d 303, 316, 203 USPQ 245, 256, (C.C.P.A. 1979), and cases cited therein.

The Decision on Appeal on page 7 asserts the following:

*In the present case, however, we do not find that Appellants (App. Br. 3-4; Reply Br. 1-2) have established either in the disclosure of the invention or the presented arguments, that the particular claimed thickness range wherein the gate insulating film thickness is greater than the gate electrode thickness is critical or produces unexpected results over the prior art overlapping thickness ranges for the gate insulating film and gate electrode.*

The Decision on Appeal on page 7 further asserts the following:

*While Appellants (App. Br. 10-12; Reply Br. 4-6) point to the disclosure at page 9, line 22 through page 10, line 13 of the Specification as providing comparative data as evidence of unexpected results of the claimed thickness range, we agree with the Examiner (Ans. 11) that no such comparative data has been presented. Further, we agree with the Examiner (id.), that the graphs illustrated in Appellants' Figures 3 and 4 show no criticality of a gate electrode thickness value that is below the 100 nm disclosed lower limit value for the gate insulator film.*

As an initial matter, page 7 of the Decision on Appeal asserts that even further, we find Appellants' disclosure (Spec. 6:30-31) that the thickness of the gate insulating film is "preferably" greater than the gate electrode thickness belies the criticality of the claimed range.

In response, the specification provides that preferably, the film thickness of the gate insulating film is thicker than that of the gate electrodes (Specification at page 6, lines 13-15).

The specification again provides that preferably, the film thickness of the gate insulating film is thicker than that of the gate electrodes (Specification at page 6, lines 30-31).

The specification likewise provides that preferably, the gate insulating film may be formed with its film thickness to be thicker than that of the gate electrodes (Specification at page 7, lines 16-18).

Here, the use of the term “preferably” makes clear that the claim language describes a preferred embodiment. *Cordis Corp. v. Medtronic AVE Inc.*, 67 USPQ2d 1876, 1880 (Fed. Cir. 2003), *Continuous Curve Contact Lenses, Inc. et al. v. National Patent Development Corporation et al.*, 214 USPQ 86, 105 (C.D. Cal. 1982).

Regarding this preferred embodiment, the claims on appeal provide for the thickness of the gate insulating film 4 being made to become greater than the thickness of the gate electrodes 5.

***Point 3.1. Thus, the preferred embodiment of the claims on appeal providing for the thickness of the gate insulating film 4 being made to become greater than the thickness of the gate electrodes 5 is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

All evidence of nonobviousness must be considered when assessing patentability. *Richardson-Vicks Inc. v. The Upjohn Co.*, 44 USPQ2d 1181, 1186 (Fed. Cir. 1997).

Consistent with the rule that all evidence of nonobviousness must be considered when assessing patentability, the PTO must consider comparative data in the specification in determining whether the claimed invention provides unexpected results. *In re Soni*, 34 USPQ2d 1684, 1687 (Fed. Cir. 1995). See also, *In re Wright*, 6 USPQ2d 1959, 1962 (Fed. Cir. 1988).

Here, Figure 1 of the present specification illustrates one example of a partially sectional view in schematic form showing a first embodiment of a thin film semiconductor device relating to this invention (Specification at Figure 1, page 9, lines 1-3).



Figures 1 and 5 of the present specification are provided hereinbelow.

FIG. 1

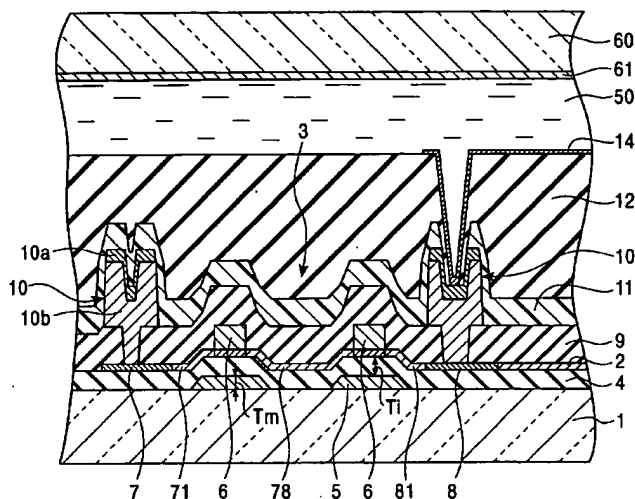
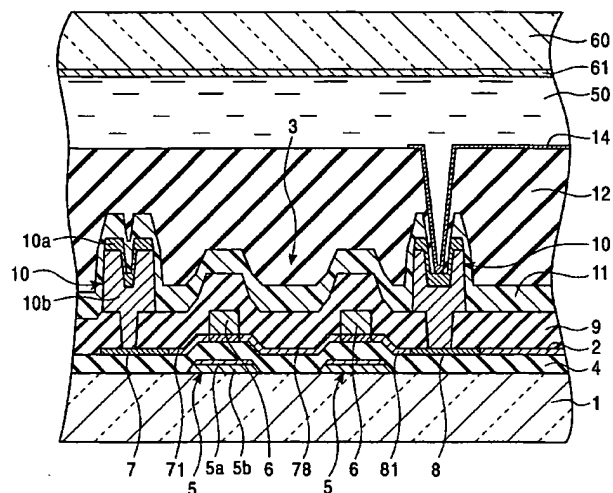


FIG. 5



The gate insulating film 4 covering the gate electrodes 5 is comprised of deposited film of, for instance, silicon dioxide ( $\text{SiO}_2$ ), whose thickness  $T_i$  is established to be greater than the thickness  $T_m$  of the gate electrodes 5 (Specification at Figure 1, page 9, lines 22-24).

Regarding Figure 5, difference from the first embodiment is that the gate electrodes 5 are not of a single-layer structure but of a multi-layer structure (Specification at Figure 5, page 13, lines 3-5).

Namely, the gate electrodes 5 are of the multi-layer structure having an upper layer 5a with comparatively low heat conductivity and high electric resistance stacked with a lower layer 5b with comparatively high heat conductivity and low electric resistance (Specification at Figure 5, page 13, lines 5-8).

Figure 3 of the specification is a graph showing the relation between the film thickness of the gate electrodes and the above-described process margin (Specification at page 12, lines 3-4).

Figures 3 and 4 of the present specification are provided hereinbelow.

FIG. 3

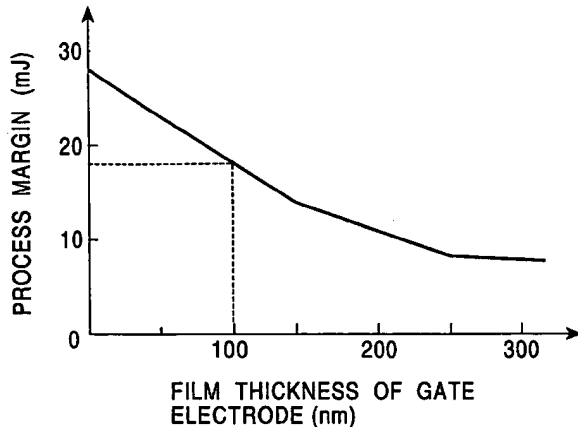
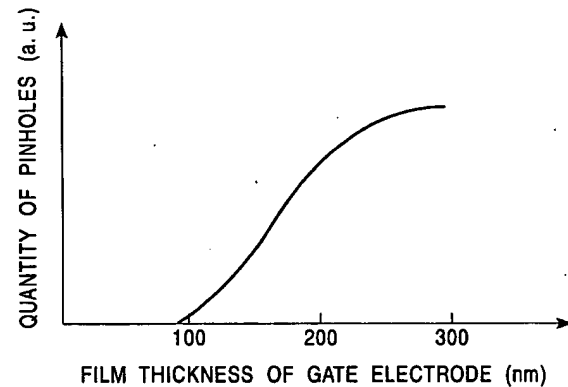


FIG. 4



Thus, comparative data between gate electrodes of different thicknesses is, indeed, depicted within Figure 3.

***Point 3.2. Thus, the contention within the Decision on Appeal of an absence of comparative data notwithstanding the relation between the film thickness of the gate electrodes and the above-described process margin (Figure 3) is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

Figure 4 of the specification is a graph showing the relation between the thickness of the gate electrodes and a quantity of pinholes appeared in the semiconductor thin film located at the level difference part of the gate electrodes (Specification at page 12, lines 16-19).

Regarding Figure 4, as illustrated, the thinner the thickness of the gate electrodes, the more alleviated becomes the level difference, and accordingly appearance of the pinholes is also reduced in quantity (Specification at page 12, lines 19-20).

Thus, comparative data between gate electrodes of different thicknesses is, indeed, depicted within Figure 4.

***Point 3.3. Thus, the contention within the Decision on Appeal of an absence of comparative data notwithstanding the relation between the thickness of the gate electrodes and a quantity of pinholes (Figure 4) is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

Here, the specification shows criticality in the thickness  $T_i$  of the gate insulating film 4 being made to become greater than the thickness  $T_m$  of the gate electrodes.

Specifically, Figure 3 portrays an effect of reducing the thickness  $T_m$  of the gate electrodes 5.

As shown within Figure 3, the thinner the thickness of the gate electrodes, the less becomes its thermal capacity, and the difference in thermal condition is reduced on the gate electrodes and on the insulating substrate (Specification at page 12, lines 6-9).

Figure 3 shows that in this case, as is clear from the graph of Figure 3, the film thickness of the gate electrodes is required to be set to less than 100 nm (Specification at page 12, lines 14-15).

By making the thickness  $T_m$  of the gate electrodes 5 to be less than 100 nm, thermal capacity can be reduced and the difference in thermal condition on the gate electrodes 5 and the insulating substrate 1 is made small, thereby trying to enlarge a process margin occurred by the laser anneal treatment (Specification at page 9, line 31 to page 32, line 4).

Figure 4 also portrays an effect of reducing the thickness  $T_m$  of the gate electrodes 5.

Especially, by making the thickness of the gate electrodes to be less than 100 nm, emergence of the pinholes may almost completely be prevented (Specification at page 12, lines 17-18).

In this case, if the thickness  $T_i$  of the gate insulating film 4 located between the gate electrodes 5 and the semiconductor thin film 2 is too thin, an effect of reducing the thickness  $T_m$  of the gate electrodes 5 is offset (Specification at page 10, lines 4-7).

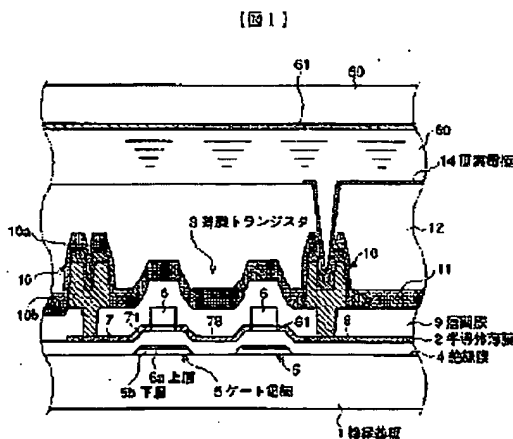
Therefore, the **thickness  $T_i$**  of the gate insulating film 4 is made to become **greater than** the **thickness  $T_m$**  of the gate electrodes 5 (Specification at page 10, lines 7-9).

The specification for the claims on appeal provides evidence pertaining to the unexpected advantages of the gate insulating film thickness being greater than the thickness of the gate electrode.

***Point 3.4. Nevertheless, criticality in the thickness Ti of the gate insulating film 4 being made to become greater than the thickness Tm of the gate electrodes 5 is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

“An applicant relying on comparative tests to rebut a prima facie case of obviousness must compare his claimed invention to the closest prior art.” *In re De Blauwe*, 222 USPQ 191, 196 (Fed. Cir. 1984).

Here, the Decision on Appeal cites Hisao as the closest cited prior art. Figure 1 of Hisao is provided hereinbelow.



The Decision on Appeal is *silent* regarding a showing within Hisao of a criticality in the relationship between the thickness of the gate insulating film 4 of Hisao and the thickness of the gate electrode 5a,5b of Hisao.

Thus, the Decision on Appeal *fails* to show unexpectedly superior results within Hisao produced by the thickness of the gate insulating film 4 being greater than the thickness of the gate electrode 5a,5b.

***Point 3.5. Thus, the absence of a showing of unexpectedly superior results within Hisao produced by the thickness of the gate insulating film 4 being greater than the thickness of the gate electrode 5a,5b is also believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

***Point 3.6. Moreover, another exception to the “optimization” rule of In re Aller regarding the thickness of the gate insulating film being greater than the thickness of the gate electrode whereby the results of this proportionality are unexpectedly good is believed to have been misapprehended or overlooked by the Board in rendering its Decision.***

#### IV. Conclusion

The absence of an intention within Hisao to represent thickness of the gate insulating film 4 being greater than the thickness of the gate electrode 5 is believed to have been misapprehended or overlooked by the Board in rendering its Decision.

In addition, an exception to the “optimization” rule of *In re Aller* regarding the parameter optimized within the claims on appeal being not recognized in the Hisao as one that would affect the results is believed to have been misapprehended or overlooked by the Board in rendering its Decision.

Another exception to the “optimization” rule of *In re Aller* regarding the thickness of the gate insulating film being greater than the thickness of the gate electrode whereby the results of this proportionality are unexpectedly good is also believed to have been misapprehended or overlooked by the Board in rendering its Decision.

The previously stated points are believed to have been misapprehended or overlooked in the Decision and are grounds upon which rehearing is sought.

Accordingly, the Board is respectfully requested to reconsider its Decision in this matter.

If any fee is required or any overpayment made, the Commissioner is hereby authorized to charge the fee or credit the overpayment to Deposit Account # 18-0013.

Dated: November 20, 2009

Respectfully submitted,

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